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ABSTRACT

Maritime history is an important part of this country's past and provides a critical foundation for understanding the settlement and development of the North American continent over the past five centuries. Teachers, historians, and maritime experts have worked together to create this manual, providing educators with materials to incorporate the history of ships and other water crafts into courses in the arts, social studies, and science. This manual, prepared by the History Channel and directed toward children in grades 5 through 8, can be used as an introductory overview or as a separate lesson plan. Teachers, for example, could develop a unit to study clipper ships. There are three lessons: (1) "Ships across Time: An Overview"; (2) "Merchant Ships and the Slave Trade"; and (3) "Navigating the Seas." Each lesson contains questions for discussion and extended activities. The activities support national history standards. (Contains a glossary and lists Internet and print resources.) (BT)

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Save Our Ships. Save Our History. Teacher's Guide.

Louise P. Maxwell
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Libby Haight O'Connell, Editor

A&E Network, New York, NY.

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THE HISTORY CHANNEL®

SAVE OUR HISTORY™

SAVE OUR SHIPS

Maritime history is an important and exciting part of our past, but it is often neglected in the classroom. Teachers, historians, and maritime experts have worked together to create this manual, providing educators with materials to incorporate the history of ships and other water crafts into a variety of courses. Why not create a special unit with the art, social studies, and science teachers working together to study clipper ships? Or use the story of the *Amistad* as a case study on slavery and the slave trade? Maritime history provides a dramatic window through which to examine the evolution of steam power, or the development of the China Trade, and fits easily into existing national standards.

You can use this manual as an introductory overview or as separate lesson plans. Either way, the subject matter can grab your students' interest and help you generate the spark of learning that is so intrinsic to effective teaching.

The preservation of our maritime heritage is an important part of *Save Our History*, The History Channel's national campaign dedicated to historic preservation and history education. We encourage you and your students to visit maritime museums or take electronic field trips via the Internet to the web sites we've recommended.

The History Channel has worked with Mystic Seaport, in Mystic, Connecticut, on this project, and is a proud partner of *Amistad America*. Refer to our list of Resources to find their web sites – they have a wealth of information that your students will enjoy.

We love feedback. Please let us know how you are using this material and how your students respond. You can e-mail us at savehistory@aetn.com, or fax us at 212-551-1540.

Libby H. O'Cll

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To the Teacher

America's maritime history provides a critical foundation for understanding the settlement and development of the North American continent over the past five centuries.

The activities in this manual are designed to give students a general overview of the evolution of ships and their changing, yet steady, role in American and World history. Many of the extended activities offer opportunities for interdisciplinary instruction, encompassing math, science, art and language arts, as well as history. This manual is directed toward students in grades five through eight, but the lessons presented here may be adjusted for use with students either above or below these target grade levels.

Project Objectives

By studying the evolution of ships and their role in American history, students will develop their skills of chronological thinking and historical analysis, and will understand cause-and-effect relationships.

National Standards

The activities in this manual support the following standards: the National Standards for History developed by the National Center for History in the Schools for grades 5-12, Standards 1-3 for Eras 1, 2, and 6-10; and the Curriculum Standards for Social Studies developed by the National Council for the Social Studies, Strands, II, VII, VIII, and IX.

Vocabulary

Any social studies unit involves learning new vocabulary. You will find a glossary at the end of this manual that defines key words printed in bold.

Lesson I: Ships Across Time: An Overview

History, Science & Language Arts

Introduction

For centuries, ships have been used to carry people and goods across vast oceans and seas. Over time, countries increasingly relied on ships for trade and for war. Ships carried passengers and cargo, defended trade routes, and battled enemy ships. As countries competed for dominance of the seas, they constantly worked to improve their ships. This has meant that over the years, ships have changed a lot, becoming faster, safer, and more efficient. Yet despite these changes, ships today still function in many of the same ways that they did hundreds of years ago, playing a role in transportation, commerce and war.

Building Ships

As soon as humans discovered that they could float on the water by binding together reeds or logs or by filling animal skins with air, they began building boats. But none of these boats were ships—an important point to remember, since many people confuse the terms "boat" and "ship." Ships are larger in size than boats, and thus are capable of transporting more people and cargo. For the very first boats, built as early as 6300 B.C.E., people hollowed out trees, but because these "dug-outs" over-turned easily, they were not very good for carrying passengers or cargo. Ancient Egyptians, who were the world's first great shipbuilders, constructed boats around 3400 B.C.E. out of papyrus reeds, which grew beside the Nile River.

The first ships appeared when Egyptians began fixing planks of cedar wood together to create the first ship **hulls**, the bodies of ships capable of carrying passengers and cargo. The world's oldest surviving ship is a cedar funeral barge that was constructed around 2500 B.C.E. for Pharaoh Cheops, who is best known for building the Great Pyramid. Early Egyptian ships were like **galleys**, which meant that they had oarsmen on each side, one large, center sail, and a long **ram** on the ship's **bow**, which was used literally to ram and sink enemy ships.

Later ship designers adapted the Egyptians' ideas, fixing the planks together by two different methods. In one design, called *clinker* construction, they overlapped the planks to create a ship hull. In the other, more sophisticated design called *carvel*, they started with a strong hull and then laid the planks over it, side-by-side. The best known clinker ships were Viking longships. Viking longships, which appeared in the 8th century in Denmark, Norway, and Sweden, became the most important ships of the open seas. These longships were used to carry Viking warriors across Europe and to North America and could be rowed by groups of oarsmen on each side or sailed by a single, square sail.

Viking Longship

In the late 15th century, European shipbuilders abandoned clinkers for carvels. The carvel was a fairly small ship, with a rounded bow and a square **stern**. Its curved hull caused it to sit higher in the water, a quality that made the ship lighter and faster than earlier models. As a result, many European explorers from the 15th century onward, including Christopher Columbus, chose the carvel to sail across the open seas.

When new technologies and new materials became available during the **Industrial Revolution**, shipbuilders began using iron and steel to make their ships stronger and more durable. During the mid-1800s, shipbuilders began covering their warships with iron plates, creating ships known as *ironclads*. Most ironclads sat lower in the water than other boats of the time, giving the enemy little to shoot at, and had enclosed gun turrets. These features made ironclads important ships in the American Civil War. When two ironclads, the **Confederates'** *Merrimack* and the **Union's** *Monitor*, met in combat in 1862, they shot at each other for more than two hours without ever piercing the armor of the other. The use of iron and steel in shipbuilding clearly changed the character of naval warfare.

During the 20th century, technological improvements have continued to change not only the nature of naval warfare, but also the ways in which people and goods are transported across the seas. Today, ships are constructed from all kinds of **synthetic** materials, like glass-reinforced plastic, making travel and transportation faster and easier.

Powering Ships

In addition to improvements in the way that ships are constructed, there also have been big advances in the way that ships are powered, that is, how ships are moved forward. Until about 1500 C.E., ships were **propelled** by a combination of oars and sails. The Egyptians used a single, square sail to propel their ships, and this was the only sail that was used for many years. Chinese **junks** and Arab ships called **dhows**, meanwhile, used more **angular** sails, which European merchant ships finally adopted in the **Middle Ages**. By the seventeenth century, European ships were employing a variety of sails of different shapes and sizes. Even after the development of steam power in the nineteenth century, sails continued to be an important component of ships for many years.

Experimentation with many different kinds of sails led to the development of the *clipper* ship, the fastest sailing ship in existence, in the mid-1800s. Clipper ships were designed specifically for speed, and were so named because they could "clip" days off of a typical sailing voyage. The hulls of clipper ships were very narrow, to cut through the water as easily as possible, and they were designed to use as much sail power as possible. One of the most famous clipper ships was the *Cutty Sark*, which had sails on three masts, and had a maximum sailing speed of 17 **knots**.

Although sails continued to be important to ships, the **Industrial Revolution** of the nineteenth century

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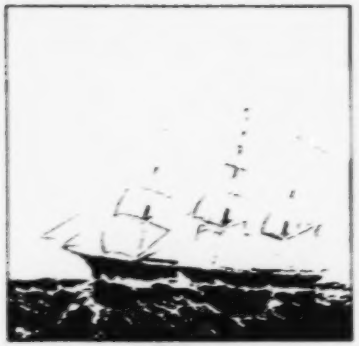
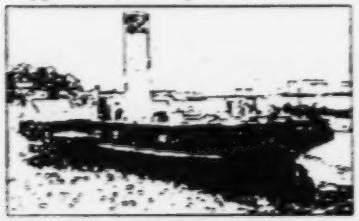


Clipper ship

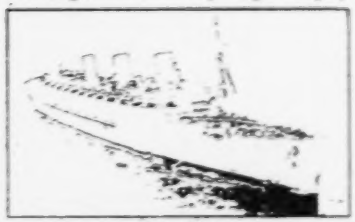
brought huge changes to ship propulsion. Ships began relying on steam, instead of sails. Steam-powered ships required someone to feed coal into a boiler, which heated water and produced enough steam to turn huge cylinder-engines. The first steamboats relied on huge wheels mounted on the ship's side, called *paddlewheels*, which were turned by these giant cylinders. Paddlewheels, however, were very heavy and **cumbersome**, and often ended up slowing ships down. One of the most famous of these early paddlewheel steamships was the *Great Eastern*,



Steamboat

built by a British engineer and launched in 1858. Paddlewheels eventually were replaced by a new kind of steam-powered engine called a *turbine* engine. Turbines pushed steam against thousands of blades, which then turned propellers that were mounted at the back of the ship. These new engines were much faster and more efficient than the earlier paddlewheels, since they were much lighter and did not stick out from the sides of the ship.

These advances in the steam engine made possible the emergence of *great passenger liners* in the late 19th century. Passenger liners quickly became the preferred method of travel across the Atlantic Ocean, and they remained the fastest and most comfortable option until the appearance of affordable air travel in the 1960s. By the 1930s, really luxurious passenger liners, known as *luxury liners*, offered first-class passengers a dizzying array of dances, dinners, and parties, all in elaborately decorated surroundings. Even third class **accommodations**, or **steerage**, often offered its passengers a step up



Queen Mary

from their typical living conditions. Many people have heard of the *Titanic*, the famous ship that sank off the coast of Newfoundland when it collided with an iceberg. But other ships of the time were equally famous. England's *Queen Mary* and France's *Normandie* were two of the best-known luxury liners of the 1930s. The *Queen Mary* measured 1,017 feet long and 118 feet wide, making it the biggest ship ever built at that time. In the late 20th century, turbine engines were replaced by *water jets*, which function almost like an octopus, drawing water in and driving it out under great pressure through pipes at the ship's stern. This new engine has made for even faster travel. One modern ship that uses a water-jet engine is the *Hoverspeed Great Britain*. In 1990, the *Hoverspeed* broke the record for the fastest Trans-Atlantic crossing. Forty years earlier, a ship had made the crossing in 3 days, 10 hours, and 40 minutes; the *Hoverspeed* made this trip in 3 days, 7 hours, and 54 minutes.

Modern Ships

Submarines, which can travel on and below the water, are another example of the amazing advances that have been made in ship construction and ship propulsion. The first submarines, built in the early 1600s, had wooden frames, were covered by greased leather, and were propelled by oars that stuck out through small, airtight holes. Since that time, remarkable improvements have been made in submarine design. Submarine hulls, which are shaped like cylinders, are surrounded by outer rings that can be filled with air or water. (Think of a doughnut, with the hole in the middle as the submarine hull, and the actual doughnut as the outer ring.) This outer ring actually is split into two parts, called *ballast tanks*, that have vents which can be opened to let water in when the submarine needs to **submerge**. When the submarine is underwater, its ballast tanks are filled with water. When the submarine is coming back to the

Submarine

water's surface, the top vents are shut and compressed air forces the water out of the tanks. When the submarine is floating on the water, the vents are closed, and the tanks are filled with air. It was this kind of submarine that played an important role in the First, and especially the Second, World Wars. Today, many countries rely primarily on **nuclear submarines**, which are capable of remaining underwater for months at a time and of firing long-range nuclear missiles without surfacing. These improvements have made submarines an even more important part of naval warfare than before.

Ships, such as submarines, have been and continue to be critical to naval warfare, but ships also still play a crucial role in shipping cargo. One of the most important **commodities** transported by ship today is **crude** oil. In fact, the demand for oil has become so great around the world that it has led to the construction of the largest ship ever built—the *supertanker*. The supertanker is almost completely devoted to carrying cargo; nine-tenths of a supertanker is used for storage tanks, while only one-ninth is used for engines, passengers, and control rooms. The *Jahre Viking*, the world's largest supertanker, measures 1,591 feet long, 226 feet wide, and weighs more than 565,000 tons!

Because supertankers like the *Jahre Viking* are so huge, they are very difficult to steer and to dock. Supertankers sit too low in the water to come to shore, so they dock at deep-water **anchorages**, instead. Here, supertankers can hook up to a pipeline and pump their oil to shore. This process is very risky and can destroy the environment if an accident occurs. When the *Exxon Valdez* had an oil spill in 1989, it leaked 11 million gallons of oil into the water, polluting more than 1,000 miles of coastline. This disaster has demonstrated the need for even safer and more efficient ships, in spite of the tremendous advances that have been made in ship design over the past centuries.

Conclusion

Even though ships have changed a lot since the first recorded ships put to sea some 5,000 years ago, they continue to perform many of the same vital functions for human civilizations that they

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always have. Ships still play important military roles, defending trade routes and battling enemy nations. They still carry people across vast oceans, and they still carry cargo upon which so many people depend. Even in the age of space and air travel, ships continue to transport the world's heaviest cargoes and offer passengers the most luxurious accommodations for long-distance travel. Ships certainly will remain central to our national heritage for years to come.

Questions

1. Explain the difference between boats and ships. What made the Egyptians' first boats different from later ships?
2. What is the world's oldest surviving ship? What does its function tell you about Egyptian society?
3. Describe the difference between clinker and carvel ships. Why did early explorers like Christopher Columbus prefer carvels for long-distance travel?
4. What effect did the Industrial Revolution have on ship design? How do you think that these changes affected modern warfare on the ocean?
5. Why do you think that early ships relied on both oars and sails for power? What disadvantages would clipper ships have had, even though they were the fastest sailing ships in existence?
6. Even though steamships were evidence of an important technological advance in ship design, they still had certain shortcomings. Describe some of these problems.
7. Describe the evolution from steam to turbine to water-jet engines.
8. Why are supertankers so vital to human society today?
9. What advantages do submarines have over other ships in naval warfare?

Extended Activities

See our Resources section at the end of this manual for web site and print sources for additional research.

1. Do additional research on the Viking longship, the Spanish caravel, or the paddlewheel steamship. Find out as many details as you can about the ship's construction and its uses. Draw a picture of the ship that you have chosen to study and then present the drawing in class. After all of your classmates have presented their drawings, "frame" the prints with construction-paper backing and display the prints on the walls of the classroom.

2. As a classroom or homework assignment, find out more about the famous Civil War battle between the *Merrimack* and the *Monitor*. When did this battle take place? What was its significance in the overall picture of the Civil War? How did this battle help change naval warfare? Individually or with a partner, create a poster-board exhibit on this battle and these famous ships, illustrating the significance of this naval engagement.

3. Ships always have been more than merely functional. They often carry tremendous emotional significance for people, as is evident in the age-old tradition of naming and christening ships. Research the name of one ship and write a brief essay to explain how and why it got its name. Be sure to explain the significance of the name.

4. A number of famous American writers have written about ships or about life at sea. Find an example and choose a passage from the novel or poem (or song) that depicts the power of the sea. You might recite the passage to the class, asking other students to comment on what images the passage evokes. Or write out the passage on parchment paper and illustrate the lyrics or words. Mount your illustrated works and create a classroom art exhibit. (Some examples to get you started are: Robert Louis Stevenson's *Treasure Island*; Herman Melville's *Moby Dick*; Ernest Hemingway's *The Old Man and the Sea*; Rudyard Kipling's *Captains Courageous*.)

5. Create an illustrated timeline of ships, starting with the earliest known ship, the funeral barge of the Pharaoh Cheops and ending with the supertanker (see suggested timeline below). Identify the ships associated with different historical eras and show the progression of shipbuilding technology. Draw pictures of the most important ships of each type. (You could do this as a class project, extending a blank timeline around the walls of your classroom, and having different students work on different ships or time periods.)

Sample Timeline

3000 B.C.E.	Egyptian Reed Boat
1180 B.C.E.	Egyptian War Galley
150 C.E.	Roman Merchant Ship
850	Viking Longship
1490	Spanish Caravel
1570-1620	Galleon (leading warship)
1802	First Working Steamship
1859	Ironclads
1897	First Ship with Turbine Engines
1906	Dreadnought
1923	First Aircraft Carriers enter service
1920s-1930s	Luxury Liners, like the *Queen Mary* (1934)
1960s	Guided-Missile Warship
1980s	Supertanker

Lesson II: Merchant Ships and the Slave Trade

History and Geography

The development of ships brought with it the expansion of merchant shipping among different countries. In America during the 18th century, a thriving trade, often referred to as "triangular trade," developed between the American colonies (and later the United States), the West Indies, the coast of Africa, and the British Isles. "Triangular trade" did not really refer to a specific trade route, but there were two basic patterns or "triangles" of trade established. In one scenario, goods from New England were shipped to the West Indies, where they were traded for sugar; the sugar, in turn, was transported to England, where it was traded for manufactured goods. In another scenario, New England goods were shipped to Africa, where they were traded for slaves, and then these slaves were taken to the West Indies, where they were traded for rum and molasses. Whatever the route, it was clear that slavery was a crucial component of this cycle and that the slave trade was extremely profitable for many participants.

The use of West Indian sugar and molasses in these global trading patterns, for example, was made possible by slave labor. Black slaves in the Caribbean raised and processed sugar into molasses, which then was used by American distillers to make rum, which was exchanged for more enslaved Africans. In addition, African slaves grew most of the cotton, rice, and tobacco exchanged by American merchants for imports such as cotton cloth and English manufactured goods. The slave trade became a hugely profitable enterprise for merchants, not just for those who bought and sold slaves, but also for all of those who traded goods produced by slaves. Chiefs along the African coast kidnapped members of rival tribes and sold them for western goods. Yankee traders earned their livelihoods by selling goods to plantation owners, and in turn, marketing the goods produced by slave labor. Northern farmers and fishermen, in addition, profited from the sale of these goods to plantation owners. In other words, many different groups of people participated in and profited from the slave trade.

Dutch, French, and English colonization of the Americas opened tremendous new markets for slave traders, especially as it became clear that settlers in these colonies would not succeed in creating a viable agricultural work force from native inhabitants of the land or from European indentured servants. Slavery in the Americas, then, emerged expressly to meet the labor shortage that arose as a result of the spread of staple-crop agriculture.

Most of the slaves that fed the Atlantic slave trade came from the region in West Africa that extended from the Senegal River through the Congo. For enslaved Africans, the Middle Passage, the sea-

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voyage across the Atlantic, was undeniably horrific. The enslaved passengers were shackled and stowed below deck where they had little or no access to fresh air and water. Sickness and disease was difficult to control under such unhealthy conditions, and many Africans died during the trip. Most slaves who survived the trip were sold into slavery, and there

Replica of the schooner Amistad

was little that captured Africans could do to escape this future. On a rare occasion, however, in July 1839, enslaved Africans aboard the *Amistad* rebelled.

This well-known rebellion occurred when 52 newly arrived African slaves, who had been purchased in Cuba—in violation of the ban on the international slave trade—were being transported along that country's coastline. Led by Joseph Cinqué, the slaves pried open their chains and took control of the *Amistad*, the cargo ship on which they were being transported. After two months at sea, as the Africans tried to find their way back to Africa, the ship was captured by an American ship and taken to New London, Connecticut, a state in which slavery was still legal. Cinqué and the other Africans aboard the ship were charged with mutiny and brought to trial in U.S. court. Their case made it all the way to the U.S. Supreme Court, where the justices ruled in 1841 that since the Africans had been illegally imported from Africa, they were the victims of kidnapping and thus had the right to attempt escape by any means. In 1842, private and missionary organizations helped raise enough money to send the 35 survivors from the *Amistad* back to their homes in Sierra Leone.

By this time, ships had ceased to be an important way of supplying slaves to the North American colonies, since the international slave trade had been outlawed. Other countries, like Brazil and Cuba, however, continued to import slaves illegally from Africa for many years. Ships also continued to play a crucial role in maintaining the profitability of slavery, by making sure that goods produced by slave labor could be transported to market. Ships and slavery, therefore, continued to be intertwined long after the legal slave trade had ended, and enslaved Africans continued to provide much of the labor upon which the Atlantic world depended prior to 1860.

Questions

1. What is "triangular trade"? Draw a diagram to illustrate this.
2. What role did slavery and slave labor play in sustaining "triangular trade"?
3. Who were some of the parties involved in keeping the Atlantic slave trade going? Is this web of participants bigger or smaller than you expected? Explain.
4. What was the "Middle Passage"? Why was it so horrific for slaves?
5. Explain the connection between staple-crop agriculture and the expansion of slavery.
6. Describe the events associated with the *Amistad* mutiny. Why do you think that this was such an explosive issue when it occurred?
7. What role did ships continue to play in perpetuating slavery, even after the end of the international slave trade?

Extended Activities

1. On a map of the world, mark the primary regions of West Africa that supplied the Atlantic slave trade. Also mark the following trading ports in the Americas: Charleston, South Carolina; New Orleans, Louisiana; Rio De Janeiro, Brazil; Havana, Cuba; and Kingston (formerly Port Royal), Jamaica. Using an atlas or some other means, determine the distance of each port from the coast of Africa. In each case, for what distances did the enslaved Africans have to endure the perilous conditions of the Middle Passage?

2. Learn more about the individuals involved in the controversy over the *Amistad* mutiny (see our Resources section for ideas to get you started). Pretend that you are a reporter and write a short newspaper article on one of the

Pocket watch

people involved, either in the mutiny itself or in the subsequent court battle, explaining his or her role in the events.

3. The Atlantic slave trade was not the first slave trade in history, but it differed from others in important ways. Do additional research to learn about the differences between the Atlantic slave trade and slavery from an earlier time period of your choosing (examples of other slave societies might include Ancient China, Egypt, Athens or Africa). Make a chart comparing the different ways in which slaves were traded in these two time periods and present your findings in class. Discuss with your classmates why these differences existed.

Lesson III: Navigating the Seas

Science, History & Technology

Early ship captains determined their ships' courses by **celestial navigation**, meaning that they measured the angle between the sun, moon or stars and the ship to figure out where they were. To do this, they used instruments like the **astrolabe** or **quadrant**, and later the **sextant**. Celestial navigation depended upon knowing exactly where in the sky the sun, the moon, and certain stars and planets would be seen from day to day. This information was published every year after 1766 in a book called the *Nautical Almanac*.

This method of celestial navigation worked fairly well for determining a ship's **latitude**, that is the ship's distance north or south of the equator, because all that a ship captain had to do was measure the height of the sun or the North Star above the horizon. It was of little help, however, in calculating **longitude**, that is how far east or west a ship is. Measuring longitude depended upon a sailor's ability to make an exact determination of his local time. The problem was that most 17th and 18th century clocks, which were **pendulum** clocks, were not very good at telling time at sea because the motions of the ship and changes in humidity and temperature threw them off. Even if a clock was off by only 1 minute, a ship could be off course by 15 **nautical** miles!

It was not until John Harrison perfected a seagoing timepiece—what turned out to be a small pocket watch—between 1731 and 1759 that a sailor could get an accurate reading of time at sea. In 1714, the British Parliament had announced a prize for anyone who could solve the problem of finding longitude at sea, and Harrison, a carpenter's son, solved the problem. Harrison's clock, known as H4, lost only five seconds during a six-week voyage from Britain to Jamaica in 1761-1762. This was an amazing feat, but it took many years for Britain's Board of Longitude to give Harrison his prize because they were skeptical of his invention.

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Although the British Parliament was slow to recognize Harrison's achievement, the effects of his invention were felt immediately. Sailors began to depend more and more on such time-keeping devices, and by the 17th century, **chronometers**, as they came to be called, were standard equipment on most ships. The better that ship captains got at determining their positions on the oceans, the better that they got at making detailed maps. Exploration and navigation thus continued to develop hand in hand.

Technological advances have made navigation more **precise**, but they also have made accurate navigation more critical. Modern navigation is not just about staying on course, it also is necessary in order for ships to avoid collision with other ships, to minimize fuel usage, and to meet established schedules. Today, ships rely on a variety of electronic devices, like radar, computers, and satellites to determine their positions. Although navigation has been transformed by advances in electronics and space science, it still depends upon the precise measurement of time—just as it did hundreds of years ago during the quest to solve the problem of longitude.

Questions

1. How did celestial navigation work? What kinds of problems might have made this form of direction-finding unreliable?
2. Why was (and is) it so important for a ship captain to know a ship's latitude and longitude?
3. Why was knowing the local time so important to a ship captain trying to determine longitude?
4. Who was John Harrison? What did he accomplish?
5. Why has precise navigation become even more crucial to ship captains today?
6. What kinds of devices do ships use today to determine their position?

Extended Activities

1. Conduct additional research on one of the early tools of navigation mentioned in the reading. Explain how, when, and by whom it was used.

2. Calculate the longitude and latitude of a number of leading maritime cities around the world. Plot these cities on a world map, showing their distances from each other.

3. Old maps provide a wealth of information, both about the extent of geographical knowledge at a certain point in time and about the social and political climate of a country or civilization. Look through a collection of old maps, or reference the following web sites:

http://www.ag.uct/~jaicbold/carto.html
http://www.library.yale.edu/MapColl/online.html
http://lcweb2.loc.gov/ammem/gmdhtml/gmdhome.html

Consider what each map tells you about a certain society or era in history, and then discuss your findings in class.

Glossary

accommodations—lodging, food and services provided
anchorage—place where ships anchor
angular—sharp-cornered; having an angle
astrolabe—small instrument that was used to measure the position of the sun, the moon, and the stars before the invention of the **sextant**
bow—pointed, front end of a ship
cargo—goods or merchandise transported in a ship or other vehicle
celestial—relating to the sky; the sun, moon, and stars are celestial bodies
chronometer—timepiece that is designed to keep time very accurately
commodity—economic good used for trade or sale
compressed—under great pressure, so as to be reduced in size or volume
Confederate—someone who joined the Confederate States of America when they separated from the Union in the U.S. Civil War
crude—raw, unprocessed
cumbersome—hard to handle because of size or weight
dhow—Arab sailing ship, with one or two masts and slanting, triangular sails
enterprise—activity that is economic in nature
galley—long, low ship, propelled mainly by oars, that was used for war and trade especially in the Mediterranean Sea
hull—body or shell of a ship
Industrial Revolution—change from an agricultural, hand-work economy to one dominated by machine-driven industry; in modern history, this process began in England in the 18th century and spread to other parts of the world
junk—ancient Chinese sailing vessel with a high stern; carries up to five masts and is still in use today
knot—measurement of a ship's speed; originally calculated by tying knots in a rope, then streaming the rope from a ship's stern and counting the number of knots that run out; 1 knot is equal to 1 nautical mile, or 6,076 feet per hour
latitude—measurement on a globe or map, indicating location north or south of the equator; measured in degrees
longitude—measurement of location east or west of the **Prime Meridian**; measured either in degrees or in hours, minutes and seconds
mast—long pole rising from the deck of a ship that supports the sails
Middle Ages—period in European history from the collapse of Roman civilization in the 5th century C.E. to the Renaissance
Middle Passage—term for an enslaved person's journey across the Atlantic Ocean from Africa to the Americas
mutiny—resistance or revolt against established authority, especially on a ship
nautical—having to do with ships or navigation
navigation—science of directing a ship or other craft by determining its position, course, and distance traveled
nuclear—powered by a nuclear reaction—a reaction in an atom's nucleus
pendulum—object that is suspended so that it swings freely, back and forth, under the force of gravity
precise—exactly or sharply defined
Prime Meridian—indicates 0° longitude; imaginary north-south line on the Earth's surface that passes through Greenwich, England and connects the North and South Poles; established in 1884, this is the reference line for the measurement of longitude and the basis for the world's standard time zone system
profitable—generating positive results or returns
propel—to drive forward or onward
quadrant—instrument used to measure altitude; usually has a 90° arc
ram—a heavy beam at the **bow** of a warship that is used to ram or pierce an enemy ship
sextant—triangular-shaped instrument, whose base is an arc marked with a scale of degrees; a sailor determined his position by measuring the angle between the horizon and whatever heavenly body he was using to navigate—the sun, moon, or stars
skeptical—doubtful or suspicious of
staple-crop—crop that is produced regularly and/or in large quantities
steerage—section in a ship for passengers who are paying the lowest fare

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stern—back or after part of a vessel
submerge—to go or put under water
synthetic—produced artificially; not naturally occurring
turret—small, enclosed structure on a warship that often revolves and is armored; used to protect the guns that are mounted within it
Union—name for the states that did not secede during the U.S. Civil War
viable—capable of working, growing or developing
vital—necessary to keeping something alive

Resources

Web Sites

http://www.comptons.com/encyclopedia/ARTICLES/0150/01667840_A.html
A comprehensive history of ships and shipping from Comptons Encyclopedia.

http://www.nmm.ac.uk/education/fact_ships.html
A concise history of ships from the National Maritime Museum.

http://www.boatsafe.com/kids/navigation.htm
BoatSafeKids offers a great history of navigation from 3500 B.C.E. up to the 20th century.

http://titanic.eb.com/
Check out a special exhibit on the Titanic from Britannica Online. Learn all about the luxury liner and its ill-fated passengers through fabulous photos and a wonderful narrative.

http://www.uscommorgjourneys.com/pages/queenmry.htm
Learn about the famous Queen Mary, the luxury passenger steam turbine liner built in 1936.

http://www.rog.nmm.ac.uk/museum/harrison/longprob.html
The Royal Observatory's online exhibit about the longitude problem and John Harrison's eighteenth-century solution, the seagoing timepiece known as H4.

http://www.amistadamerica.org/
Visit *Amistad America*'s online exploration of the Amistad mutiny of 1839-1842. Offers valuable resources for teachers.

http://www.ironclads.com
A great site with pictures and descriptions of the battle between the *Merrimack* and the *Monitor*.

http://www.civilwarhome.com/navalwar.htm
Learn about the little discussed Navy's role in the Civil War.

http://www1.minn.net/~keithp/index.htm
Go to the Columbus Navigation Homepage, an award-winning site dedicated to the history, navigation, and landfall of Christopher Columbus.

http://www.whom.co.uk/squelch/bbships.htm
Brook Bond tea presents the Saga of Ships, a collection of historical ships picture cards.

http://www.sciam.com/1998/0298issue/0298hale.html
This *Scientific American* article explains how long, narrow ships packed with warriors helped to make the Vikings the dominant power in Europe for three centuries.

http://www.globalindex.com/clippers/museum/welcome.htm#BL
Visit the Clipper Ship Museum to learn about the history of the clipper ship and the impact that these speedy ships had on their time.

http://www.oilspill.state.ak.us/
The Exxon Valdez Oil Spill Trustee Council provides information about the impacts of the oil spill, and information about ongoing restoration and research activities. Get the basics under Historical Info.

http://www.mysticseaport.org
Visit the Mystic Seaport Museum to learn about the fascinating history of a shipbuilding town and about America's maritime past.

http://www.seahistory.org
Find out more about current efforts to preserve our historic ships and how to get involved through the National Maritime Historical Society.

Books

Biesty, Stephen and Richard Platt. *Stephen Biesty's Cross-Sections: Man-of-War*. (Dorling Kindersley, 1993). Presents a detailed look, deep inside an 18th-century war ship. Each page reveals a different layer of the ship, depicting activities and people on the ship in cut-away illustrations.

Calver, Henry B., Gordon Grant (Illustrator). *The Book of Old Ships: From Egyptian Galleys to Clipper Ships*. (Dover Pictorial Archive: 1992). Includes 80 incredible line illustrations of history's most important sailing ships, beginning with an Egyptian galley and ending with a clipper ship built in 1921.

House, Derek. *Greenwich Time and the Longitude*. (Philip Wilson Publishers, Ltd., 1997). Tells the story of the finding of longitude at sea, which precipitated the founding of the Royal Observatory at Greenwich, over 300 years ago.

Humble, Richard. *Timelines: Ships, Sailors and the Sea*. (Franklin Watts, Grolier Publishing: 1996). Features a thorough overview of the evolution of ships and a brief history of those who sailed them, from the earliest known ships to the most modern, multihulled ferries.

_____. *Ships: A Stunning Visual History of Ships*. (Barnes & Noble Books, 1995). Provides a well-illustrated history of ship design, from Egyptian warships to high-speed ferries.

Konstam, Angus. *The History of Shipwrecks*. (The Lyons Press: 1999). Visit sunken Roman warships, Spanish galleons, colonial vessels and 20th century luxury liners, in full color at the bottom of the sea!

_____. *Pirates: 1660-1730*. (Osprey Publishing, Ltd.: 1998). Portrays those pirates who sailed the waters of the Caribbean and of the American coastline during the golden age of piracy.

La Pierre, Yvette, Nancy Kober (Editor). *Mapping a Changing World*. (Thomasson-Grant & Lickle, 1996). Introduces young readers to a variety of wonderful attempts to map our world, beginning with an ancient Babylonian map etched on a clay tablet, and ending with a radar image of a Russian volcano.

Tassin, Myron. Ed. *The Delta Queen: Last of the Paddlewheel Palaces*. Includes an essay and vintage photos tracing the history of steamboating on the Mississippi River, a history of the *Delta Queen*, and a diary account by one passenger of the "Good Times Jazz Cruise" held in the fall of 1972.

Woodman, Richard. *The History of the Ship*. (Conway Maritime Press, 1997). Inspired by Conway's 12-volume, *History of the Ship*, this concise edition provides a comprehensive story of seafaring from the earliest times to the present day.

Note

Younger readers may find the **Eyewitness Readers** on *Pirates* and the *Titanic* helpful resources. H

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